

CHAPTER III

Specific Elements of Your Aquatic Plant Management Plan

This chapter takes the basics of the planning process discussed in Chapter II and puts it to work. It is designed to help you match the actual techniques and level of detail with your particular situation. This guide will help assure that the plan you develop will meet your needs and gain the approval of the DNR. Be sure to contact a DNR lake coordinator or Aquatic Plant Management (APM) coordinator (from here on referred to as the DNR lake coordinator) to discuss your APM plan as it develops. Every lake is unique and will benefit from an aquatic plant management plan. After assessing your lake, you may find that there is no need for any manipulation, or you may find a moderate problem needing some treatment or a severe or wide spread problem, necessitating a significant manipulation. This guide provides the flexibility to create a plan appropriate to the level of aquatic plant management required for your lake.

GRANTS

Grants are available through the DNR to help lake organizations manage aquatic plants. NR 190 Lake Management Planning Grants can be used to develop APM plans. Small-scale grants may be useful in conducting the first phase of your aquatic plant management planning program, and large-scale grants of up to \$10,000 may be applicable if considerable data collection is needed. NR 191 Lake Protection and Classification Grants are available for up to \$200,000 and can be used to implement plans for improving lakes, restoring native plant communities and other work. The NR 198 Aquatic Invasive Species Control Grants can provide 75% cost-sharing for a variety of projects specific to the prevention and control of aquatic invasive species. The NR 7 Recreational Boating Facilities Program provides cost-sharing for the purchase of aquatic plant harvesting equipment and limited funding for the chemical control of Eurasian water milfoil. Work with your regional DNR lake coordinator or environmental grants specialist to select the best grant options based on your specific situation.

For more detail on these Natural Resources administrative rules, go to the Wisconsin Legislature: Infobases at <http://folio.legis.state.wi.us/> and click on *Administrative Code* then find the specific rules under the *Natural Resources* heading.

This chapter is divided into three parts: the first part includes information everyone must collect to complete an Aquatic Plant Management Plan for Department approval. The second part includes information needed if you plan to do any permit-requiring manipulation on your lake such as an herbicide treatment, harvesting or a drawdown. You will need to apply for a permit for these and other lake manipulations, but the goal is that your plan will include all the information needed for the permit. The third part includes information on what to do if you discover a pioneer population of an aquatic invasive plant (AIS or aquatic invasive species, though we are mainly concerned with plants in this document) in your lake. We want to have a seamless path between gathering lake information, creating recommendations for treatment and fulfilling the permit requirements.

It is critical that you maintain a close working partnership with the local DNR aquatic plant manager so that your analysis and recommendations for treatment will be acceptable to the DNR, who must approve the Aquatic Plant Management and any permit requests.

**MANAGEMENT
LEVELS**

No manipulation. A protection-oriented plant management plan where no significant plant concerns exist or no management is proposed.

Useful for a lake appraisal where the goal is to begin to understand the lake's plant ecology. A healthy aquatic plant community exists and invasive and non-native species generally are not present.

Small-scale manipulation. Primarily protection-oriented plans where slight to moderate plant concerns exist and some management is proposed. Proposed treatments involve less than 10 acres or less than 10% of the littoral area. Invasive species may be present.

Large-scale manipulation. Moderate to severe plant concerns exist. Extensive management is proposed (more than 10 acres or more than 10% of the littoral area) that may substantially impact or change the current state of the lake ecosystem. Established infestations of invasive species usually are present.

Whole-lake-scale manipulation. Large-scale manipulations involving ≥ 160 acres or $\geq 50\%$ of the lake littoral area)

Part 1. Creating Your Plan

Goals

- **A Goal Statement.** This is a general description of the plan's management goals (see *Chapter II*, page 17).

Example:

We hope to maintain a healthy plant community on Blue Lake by inventorying and monitoring the plant community and being aware of changes and being on guard for invasive species.

- Maintain the plant community like it is.
- Monitor for aquatic invasive plants.
- Educate and inform lake residents about APM planning activities.
- Protect aquatic plants in sensitive areas.
- Promote the protection and expansion of diverse native plants.
- Prevent the introduction of nuisance invasive plants.
- Reduce nuisance plant growth in high recreational use areas.

TYPICAL
APM GOALS

Inventory: Lake Information

All plans need to be based on a factual understanding of the lake ecosystem. The purpose is to characterize the historical and current conditions of the waterbody's aquatic ecosystem. Much of this information (raw data) can be presented in appendices. However, the plan should describe what data were collected and how, and include a narrative description of the planning process.

The DNR requires the grantee to turn in all data collected, including maps and shape files generated from the data, lists and other information.

Management History

- Describe the historical control actions taken or those currently being used to manage aquatic plants. Explain the results of those actions and why they are, or are not, still being used. In some cases it may be a statement that says nothing was ever done to manage plants.
- If records are available summarize them in an appendix or in the body of the management history section. These data can become useful for evaluation even if it happened decades ago.

- Describe different stakeholder viewpoints and potential conflicting philosophies over plant management.

Plant Community

An evaluation of the aquatic plant community is the foundation of the Aquatic Plant Management Plan. All plant surveys and sampling described below should be conducted between mid-June and the end of August except where noted (e.g. Secchi readings) or when early season growth species like curly-leaf pondweed is a primary concern. Contractors and organizations must consult with the DNR lake coordinator regarding survey techniques and what time of year the survey should be done.

All plant surveys and sampling should be conducted between mid-June and the end of August except when early season growth species like curly-leaf pondweed is a primary concern.

Details on the protocol for conducting plant surveys can be found in [Appendix B - Recommended Baseline Monitoring of Aquatic Plants in Wisconsin: Sampling Design, Field and Laboratory Procedures, Data Entry and Analysis, and Applications](#) (from here on *Appendix B*).

- Collect quantitative data on the lake’s aquatic plant community throughout the littoral zone using the protocol described above and the [Appendix C - Aquatic Plant Survey Data Workbook](#) (from here on *Appendix C*). This Excel workbook provides field data sheets, data entry sheets and automatically calculates summary statistics. This will create:
 - An aquatic plant species list, where each species is found in the lake and the abundance of each species found.
 - The relative frequency of each species
 - The depth at which each species is found.
 - Lake bottom sediment types.
 - A description of the near-shore vegetation observed during the Boat Survey as described in the plant survey protocol.
- Collect two samples of every species (also described in the sampling protocol). Press, dry and voucher each sample. The lake organization may keep one specimen, and the regional DNR office will send one on to the vouchering institution. DNR may require that these specimens be in hand before a permit for herbicide treatment is authorized. For a detailed description, please see [Appendix B](#) and, specifically, see sections:
 - *Collecting and Identifying Voucher Samples*
 - *Plant Identification and Troublesome Taxa* and
 - *Pressing Plants – Preparation of Voucher Specimens*
- Determine the lake’s Floristic Quality Index and Aquatic Macrophyte Community Index (see *Calculate FQI and AMCI Worksheet* in [Appendix C](#)).
- Certain weevils (aquatic insects) eat northern water-milfoil and will eat Eurasian water-milfoil if this species is present. If either of these water-milfoil species is found during the initial aquatic plant survey, you may want to look for and estimate

weevil damage (please see [Aquatic Invasive Species Monitoring: Water-milfoil Weevil](#)).

- A quantitative plant survey of the lake plant community should be performed at least every five years. Watch for changes in species diversity or changes in abundance of native species, and not just for the presence or absence of exotics. A decrease in diversity or an increase of one particular species may be an early-warning sign of changing water quality.

Lake Map

Most people comprehend faster when given information in a visual format. A map is a very quick and reliable way to assure that everyone knows the place you are talking about when you describe a certain point on your lake. A map will assist in locating plant communities, recreational and habitat use areas, and more.

- Obtain a map with an accurate scale (the US Geological Survey 1:24,000 scale topographic map series is widely available).
- Determine the location of the lake using the township, range and section designations.
- Tabulate the lake area, and maximum and mean depths.
- Find the Water Body Identification Code (WBIC) assigned by DNR.
- Obtain any available aerial photos, preferably those that are to scale (such as the US Department of Agriculture Natural Resources Conservation Service aerial orthophotographs).
- Using the aquatic plant community data, create maps of the lake vegetation. Include:
 - A map showing locations of the various plant communities of interest, including aquatic invasive species, if present, and corresponding densities (see [Appendix B](#)).
 - A map showing proposed treatment areas, if any are expected.
 - A map of areas containing threatened, endangered, and special concern species. Include any Critical Habitat Designations, if one was performed for that lake and if it described vegetative sensitive areas (see [DNR Surface Water Viewer](#)).
 - Maps created using GIS (such as ArcGIS) will be most useful, however all maps should be based on GPS coordinates. Please see [Appendix B](#) for instructions on generating ArcGIS maps from the data collected and organized in the Aquatic Plant Survey Data Workbook. (This map-generating section is still under development). For all plans, maps should include GPS coordinates as reference points
 - For plans expecting a large-scale manipulation of more than 10 acres or more than 10% of the littoral zone, maps created using GIS will allow for the most efficient permit planning, evaluation, tracking, and summary.
 - When a state grant is being used to fund an APM Plan, submittal of a copy of the GIS maps and shape files used to maps them will be required to satisfy completion of the grant.

Fisheries & Wildlife Habitat

All aquatic life is linked to the aquatic plant community, which supplies habitat and food. It is essential to identify and develop a portion of your plan to assure the protection and enhancement of fish and wildlife habitat, endangered resources, and other local natural resources of concern. Be sure to hold a discussion with the DNR fisheries biologist to identify any special issues early in your planning process.

Prepare a narrative characterization of the fish and wildlife community and their ecological relationship to the aquatic plant community from existing data.

- Append a Critical Habitat Designation (CHD) assessment, if one has been done for the lake at any of the following websites:
 - [For Critical Habitat Areas](#)
 - [For Areas of Special Natural Resources](#)
 - [For Outstanding and Exceptional Waters](#)
- If there is no CHD assessment, report conservancy areas recognized as having exceptionally good habitat for fish, waterfowl, and other wildlife on a map.
- Have a discussion with the DNR fisheries biologist about your plans.
- Please be aware that a permit for herbicide treatment in sensitive locations as identified by the DNR may (or may not) be denied.

Water Quality

There is a relationship between plants and water quality. Changes in the plant community can affect changes in water quality, while changes in water quality (such as nutrient enrichment) can affect the types and densities of aquatic plants. Your knowledge of water quality conditions must increase as the intensity of plant control measures increases. Water quality data should be included in a summarized fashion in an appendix or in the body of the water quality section. Some data can be collected and evaluated with volunteers. For other data you may wish to use a consultant. Reference any ongoing monitoring programs from the [Citizen Lake Monitoring Network](#).

- Obtain one year of current water quality data consisting of a minimum of 4 to 5 Secchi disk transparency readings (about every 2 weeks) from June 1 through August 31.
- Prepare a summary of any historical water quality data.
- Prepare a brief analysis of how plants and water quality may be affecting each other.
- **If you plan any lake manipulation** the DNR lake coordinator may ask you to provide more detailed water quality data.
 - In order to collect water quality data, you may want to become a Citizen Lake Monitor and follow the sampling protocol for volunteers doing chemistry monitoring: again contact the [Citizen Lake Monitoring Network](#).
 - Collect surface samples to measure total phosphorus concentrations in early spring, and chlorophyll *a* and phosphorus concentrations in mid-summer.

- Measure water temperature and dissolved oxygen concentrations during summer at the deepest part of the lake at 1-3 meter or 5-10 foot intervals to determine whether the lake stratifies. This information can be helpful in determining some control strategies and in explaining some observed phenomena (e.g., late summer fish kills). The level of dissolved oxygen may provide information on the possibility of internal nutrient loading, which may fuel late season algal blooms.
- If you are considering plant harvesting, take a turbidity sample in an area that might be harvested.

Water Use

Understanding the patterns of recreational use on the water will help determine where and how plants need to be managed. Label the lake map and provide a description of key areas on the lake. Describe any surface use ordinances, use restrictions such as no-wake areas, park hours or motor use hours if applicable.

- Note the established or primary human use areas and use patterns in the lake and on shore (e.g., swimming beaches, boat launches, ski lanes, fishing grounds).
- Mark any areas of the lake where there is restricted use, for any reason.
- Identify the locations of any water intakes for public water supply or irrigation use.
- Identify areas where individual riparian plant concerns exist and where you think management may be proposed.
- **If you plan to do a large scale manipulation** (more than 10 acres or more than 10% of the littoral zone):
 - Assess lake users' perceptions and opinions on how plant conditions affect recreational use. Some possible approaches might include surveys, focus groups or other techniques. (See Chapter II.)
 - Identify riparian expectations and compare them to the physical conditions of the lake (For example, a shallow, nutrient rich lake is likely to have abundant native plants and manipulation is unlikely to change that situation. Is there an interest to blend management to best coincide with natural conditions, or is there an expectation to reshape conditions into unnatural, high maintenance areas? This is where a group can better understand and form realistic goals.)

Watershed Description

A lake is a reflection of its watershed. The human activities in the watershed may be playing a role in the nutrient loading in the lakes and the nature of the aquatic plant community. (If there is a serious algae problem on the lake, watershed issues will be more important and a nutrient budget may be necessary, but this is beyond the purview of a simple aquatic plant management plan.)

Map the watershed boundaries showing the major inflows and outflows.

- Determine the watershed area.
- Quantify (i.e. find the percentage of each category) the forested, wetland, agricultural, residential, commercial/industrial and other land use areas within the watershed. This will help to identify potential problem areas and source areas

associated with point and nonpoint source pollution. These data will provide baseline information on watershed land use.

Analysis and Alternative Treatments

You have now gathered substantial information on the lake. You know the history of the lake, all about the plant community and are ready to tend your “garden”, vigilant for “weeds” and other danger signs of declining lake health. The purpose of this element of the plan is to demonstrate your understanding of the lake’s plant ecology and set management objectives. It will be the most individualized part of the plan and will be the most difficult to “cookbook.” This will be the part that the DNR lake coordinator will look at most closely when reviewing the finished plan. It should show how the need for any control action was determined. The analysis can begin by determining the impact of a “do nothing” scenario. Go back to your original goal statements and compare them to the findings of the inventory. Map and overlay the information collected in the inventory and interpret the results.

- Summarize your findings using data and maps generated from the inventory.
- Identify the management objectives needed to maintain the beneficial uses of the aquatic ecosystem and recreational needs.
- Keep your results and summary so that you may refer to it in the future. Submit all results (data survey and all electronically generated maps) electronically to the DNR. Contact the DNR lake coordinator to learn where the data should be sent.
- If you are considering a plant manipulation such as an herbicide treatment or a harvesting program, you must evaluate the pros and cons of this direction.
 - Hold a meeting to inform stakeholders of findings, discuss recommendations and implementation details.
 - Discuss why a manipulation is necessary. Sometimes no action is best, even if there is a small population of an invasive species.
 - If a manipulation is deemed necessary, consider several alternative management techniques. (see [Chapter IV](#)).
 - Do more than simply list treatments. Briefly summarize and assess each technique being considered, given your lake’s situation.
 - Discuss all options with interested lake users and appropriate agencies.
 - Remember that different techniques may be suitable in different parts of the lake.
 - For example, an herbicide treatment may be best in a bay heavily infested with EWM but a lightly infested walleye spawning area might be best handled by hand removal by SCUBA divers.
 - Discuss the potential adverse impacts that each technique (or the project as a whole) may have on non-targeted species, drinking water or other beneficial water body uses. Plans should include measures to protect the valuable elements of the aquatic plant community and plants that enhance habitat for fish and aquatic life.

- Identify the specific areas proposed for manipulation on a map (using GPS coordinates) and the kind of manipulation.
- Please see more in *Part 2: Implementing and Evaluating Your Plan* of this chapter.

Recommendations

This may be the part you have been waiting for, a chance to give your suggestions for plant management. This section considers the results from the **Analysis and Alternative Treatments** and other portions of the plan leading to the preferred management strategies for the lake. Now, write up your recommendations to ensure your lake stays healthy, including:

- Your analysis from the previous section.
- Ideas from your stakeholders. Hold a meeting to inform stakeholders of findings, discuss recommendations and implementation details.
- Aquatic Plant Issues
 - If you do find an exotic species, please see Part 3 of this chapter, *Contingency Plans for Newly-found Populations of an Aquatic Invasive Species*.
 - Evaluate the diversity, abundance and distribution of native species. Holding on to native plant species is the key to keeping the lake healthy. You may want to consider special care for parts of your lake where plants are either abundant or scarce.
 - In general, a quantitative evaluation (survey) of the lake plant community should be performed at least every five years (see Plant Community above).
 - Watch for changes in species diversity or changes in abundance of native species, and not just for the presence or absence of exotics. A decrease in diversity or an increase of one particular species may be an early-warning sign of changing water quality.
 - Track parameters such as the Floristic Quality Index (see *Calculate FQI* in [Appendix C](#)).
 - Remind shoreline owners not to remove plants in the water, except according to the plan
 - Even activities that do not require a permit, such as the 30' riparian manual removal zone, need to be considered as part of the plan to remove plants.
 - Remind lake shore property owners that it is better to leave near-shore plants undisturbed even though some plant removal is allowed without a permit.
 - Note that if 100 riparian owners each pull out 30' of plants that is 3000' with no plants!
- Consider the results from any Critical Habitat Designations that have been completed on the lake and whether any sensitive areas or any conservancy areas recognized as having exceptionally good habitat for fish or waterfowl are within the manipulation area.
 - Discuss and consider regulations designed to limit boating in sensitive areas

- Watershed, Shoreland and Water Quality Issues:
 - Include information on the value of a natural shoreline to protect the aquatic plant community and consider local ordinances to preserve or rehabilitate natural shorelines.
 - Encourage lake front property owners to leave wide, naturally vegetated buffers between their homes and the lake.
 - Involve the public in keeping the lake healthy by finding ways to decrease harmful watershed inputs:
 - Discourage the use of fertilizers on lake front property.
 - Consider measures designed to target sources of nutrients that contribute to extensive aquatic plant growth
 - Get help from the DNR and county Land and Water Conservation Departments (LWCD).
- If your recommendations will include an herbicide treatment, a harvesting program or other manipulation, a few additional issues must be considered. Your lake group's recommendations, especially if they involve some sort of manipulation, must be reviewed, and approved by the DNR. For example, the DNR might recommend different timing for an herbicide treatment or a different off-loading site for a harvester.
 - You should be in close contact with the DNR lake coordinator all parts of this component, you will be ready to apply for a permit.
 - Consider the results from any Critical Habitat Designations that have been completed on the lake and whether any sensitive areas or conservancy areas recognized as having exceptionally good habitat for fish or waterfowl are within the manipulation area.
 - Discuss and consider regulations designed to limit boating in sensitive areas or areas where there are communities of plants dominated by Eurasian water milfoil.
 - If the manipulation will involve more than 10 acres or more than 10% of the littoral zone, there must be pre- and post-treatment evaluation. See [Appendix D - Aquatic Plant Treatment Evaluation](#) (from here on *Appendix D*). This evaluation takes considerable planning and coordination with the DNR, consultants, and applicators.
 - Next Step: See *Part 2: Implementing and Evaluating Your Plan* in this document.
- Get Involved
 - If you have not done so already, become part of the [Citizen Lake Monitoring Network](#) to monitor for invasive species and develop strategies including education and monitoring activities.
 - Implement a "[Clean Boats, Clean Waters](#)" program as a component of the aquatic plant management plan. This program actively informs lake front property owners and public boat landing users of the need to prevent the spread of aquatic invasive species.

Part 2. Implementing and Evaluating Your Plan for an Aquatic Plant Manipulation

This section is designed to help you create an implementation plan once you have decided on a manipulation to deal with a plant problem. A manipulation includes an herbicide treatment of an established population of an invasive species, a harvesting regime for nuisance invasive or native plants, or a drawdown. The DNR often distinguishes a manipulation with the goal of restoration of a balanced plant community, from management of an ongoing nuisance (invasive or native) problem. Both situations will involve a permit, but manipulations with restoration as a goal best fall into this section. Please discuss with the DNR lake coordinator whether it is necessary to follow the guidance in Part 2 if you are managing your lake plant issues with routine treatment of some kind. (If this is a new pioneer population of an invasive plant, please see *Part 3. Contingency Plan for Newly-found Populations of an Aquatic Invasive Species* in this document.) Regardless of the type of treatment planned, include the DNR lake coordinator in deciding on your best management strategy. Please consult the [DNR's Wisconsin's Aquatic Plant Management and Protection Program](#) web site for information on contacts, permit requirements, permit application forms and more information. In the end it is the actions you take that will determine success of your plant management program.

When you are planning a manipulation it is important to realize that the steps necessary for acquiring a permit, performing the manipulation, and evaluating the results are interwoven and must be planned carefully. For example, in order to measure the success of some herbicide treatments, you must assess the original conditions (pre-treatment evaluation) so that they can be compared to the final conditions (post-treatment evaluation), with the treatment itself sandwiched in between. These steps are laid out in more detail in the “*Prior to the Permitting Process*” and “*Aquatic Plant Community Evaluation*” sections below.

Much of what is needed in the implementation plan is also needed for an AIS grant, so there will be an economy of effort if you are planning to submit a grant to support your implementation plan. For information on lake grants, go to the UW-Extension Lakes website [“Law and Grants” page](#) or see the [AIS Control Grant Application form](#).

Prior to the Permitting Process

Just as an aquatic plant management plan required a great deal of data-gathering, more information must be collected before applying for a permit to perform a plant manipulation. In most cases, you must have an approved plan (including an implementation plan) before a permit for treatment will be issued. However, much of the information listed below is also needed for an herbicide permit, especially for large scale herbicide projects so again, completing the implementation plan will help you prepare to apply for an herbicide permit. Your implementation plan should include:

- A description and map (using GPS) of the project area, including proposed treatment plots
- A description of the problem to be addressed by project

- A discussion of the project goals and objectives
- A description of methods and activities
- A description of project products or deliverables
- A description of data to be collected
 - The DNR may require pre- and post-treatment monitoring for herbicide treatments of more than 10 acres or more than 10% of the littoral zone in manipulation (please see the [Compute Pre & Post Data](#) worksheet for details).
- A description of existing and proposed partnerships
 - Be clear on roles and expectations of the consultant, applicator and lake association members and anyone else involved in the project- who does what and when?
 - Decide on the firm that will carry out your manipulation. Ideally, the firm that does the pre- and post-treatment monitoring is different from the firm that performs the herbicide application. There is a potential for, or the appearance of a conflict of interest if the herbicide applicator assesses the success of its own herbicide application.
 - Describe how the public will be involved.
- A discussion of role of project in planning and/or management of lake
- A timetable for implementation of key activities

Example timeline for herbicide treatment of Eurasian water-milfoil:

February 2010: Apply for grant
 (there is also an August 1 deadline)

August 2010: Establish and carry out pre-treatment evaluation
 (first phase of pre-and post-treatment evaluation)

May 2011: Perform herbicide treatment

August 2011: Carry out post-treatment evaluation

Fall 2011: Write up results of treatment

EXAMPLE
TIMELINE

- A budget, including operational cost estimates and identification of funding sources, including plans for any grant applications.
- A plan for sharing project results with community and DNR
 - Describe the process by which the plan will be adopted, revised and coordinated, with DNR approval.
 - For example, the original plan may have called for a large-scale 2,4-D treatment of 30 acres of Eurasian water-milfoil. The following year, you may only need to apply for a permit for spot treatment of 2,4-D in certain locations.
- A special evaluation when a whole-lake scale manipulation is planned (e.g. drawdown or herbicide treatment of more than 50% of the littoral area, or in conjunction with a fish rehabilitation project). Contact the DNR lake coordinator to see if an Environmental Assessment is needed.

Applying for a Permit: Treatment-Specific Requirements

- **Harvesting**
 - Obtain a Mechanical / Manual Aquatic Plant Control Application ([Form 3200-113](#)) from the DNR.
 - Identify plant offloading and disposal locations sites (using GPS coordinates or ¼ section of township, range and section designations).
 - Identify where and how you will obtain the needed equipment (harvesters, trucks, unloading equipment, etc.)
 - Refer to [Chapter NR109](#) for full details
 - If this is an ongoing nuisance-relief harvesting program, speak with the DNR lake coordinator about requirements for an APM plan.

- **Herbicide Application**
 - Obtain a Chemical Aquatic Plant Control Application ([Form 3200-004](#)) from the DNR.
 - If the estimated acreage is greater than 10 acres, or is greater than 10 percent of the estimated area 10 feet or less in depth, complete and attach [Form 3200-004A](#), Large-Scale Treatment Worksheet
 - This form requires the applicant to identify
 - Recreational needs of the property owners and visitors
 - Value of the proposed treatment area to fish and wildlife
 - Cause(s) of the excess plant growth problem
 - Short and long-term solutions to the problem
 - Please see [NR 107](#), and especially NR 107.04 for details on herbicide permit requirements for large-scale projects, such as public notification.
 - Consider the timing of the herbicide application. With few exceptions, any large-scale herbicide treatment of EWM and CLP should be accomplished by the end of May (contact the DNR lake coordinator).
 - Specify the herbicide(s) to be used, method of application and dose level.
 - If the treated area will be greater than 0.25 acres, the product to be used is classified as a restricted use pesticide and/or a liquid herbicide will be used, a certified applicator must apply the herbicide.
 - The herbicide application may be supervised by DNR personnel.
 - Be aware that as new information develops, an annual permit may change to reflect current Best Management Practices.

- **Drawdown**
 - Produce a map showing exposed lakebed and affected plant communities.
 - Contact the Water Management Specialist for your County to determine whether a Chapter 30 permit is needed.
 - Discuss with the DNR lake coordinator how to evaluate the results of the drawdown.

On the Day of Herbicide Treatment (or other Management Action)

The herbicide applicator will be busy on the day of the application, but be sure that every permit requirement has been addressed before application takes place. Consider having a lake resident or consultant on hand to oversee the operation. In particular, be sure that the following items are done before or on the day of treatment:

- Verify that pesticide notice signs are posted and that they contain correct information.
- Assure there is a copy of the Implementation Plan at hand and all necessary permits.
- Review the permit and any special conditions. Review what areas will be treated, and what will be done in each area.
- Verify with the contractor that conditions are proper for the intended method including wind speed, water temperature, and growth stage of the target plants.
- At the end of an herbicide treatment, ask for a copy of the Treatment Record Form to have in the lake records.
- Consider having lake residents familiar with the plan take pictures and notes from a separate boat.
 - Keep a log or notes of the day's actions, and note any unusual conditions that may affect the outcome, or give reason for complaints.
 - Be inquisitive, ask the contractor when you have questions to learn and understand what is going on.

Aquatic Plant Community Evaluation

Following any treatment, you will want to answer the following questions: Did the implemented management plan meet the management objectives? If not, what is the next step? Did anything change (for example, were non-targeted plants harmed or was there significant oxygen depletion?)

- Herbicide manipulations on more than 10 acres or more than 10% of the littoral zone requires an assessment of the effectiveness of the treatment. (If you are treating less acreage than this, you do not have to perform this evaluation.)
 - The protocol for evaluating large-scale treatments is in [*Appendix D - Aquatic Plant Treatment Evaluation*](#).
 - This protocol necessitates several visits to the lake per year but must be done to assess the overall success of the herbicide treatment. Once there is a track record for the success rate of these large scale herbicide treatments, the evaluation process may be scaled back.
 - Ideally, plant community evaluations should be conducted by an independent party not directly affiliated with the herbicide applicator to prevent bias or appearance of bias.
- Smaller herbicide or harvesting manipulations
 - There is no formal treatment evaluation required for smaller herbicide treatments, or other types of treatments such as harvesting, but there should be a qualitative assessment of the treatment. For these non-large scale herbicide treatments, the lake group should report:
 - How well the treatment accomplished its goals

- Was there a noticeable change in the abundances of invasive species and/or native species?
- Whether and/or how soon the targeted plants grew back to nuisance levels following harvesting
- Oxygen levels, watching for low oxygen levels due to decomposing plants that might be harmful to the fish and other lake animals (see more under *Water Quality Evaluation*, next section)
- Suggestions for the following year

Water Quality Evaluation

Water quality changes may result from large scale manipulations of the plant community, and should be closely monitored. For example, there could be negative impacts on dissolved oxygen levels or an algal response to nutrients released from decaying vegetation. Another concern might be increased algal growth due to less competition for nutrients from macrophytes, especially in shallow, eutrophic systems. In addition, monitoring of herbicide residues can be useful to evaluate effectiveness of treatments and monitor safety thresholds. Some general monitoring steps are listed here, but the exact monitoring requirements will vary with the specifics of each project and will be established in consultation with the DNR lake coordinator.

- Secchi disk water clarity is a useful and cheap tool for monitoring changes in water quality.
- For large-scale treatments (greater than 10 acres or 10% of the littoral zone and where treatment depth is 10 feet or less), obtain dissolved oxygen concentration profiles weekly for four weeks following a manipulation that leaves aquatic plant biomass in the lake.
- For whole-lake scale projects (those involving ≥ 160 acres or $\geq 50\%$ of the lake littoral area), more water quality evaluations may be required. Collect water quality (total phosphorus, chlorophyll a, and pH) samples weekly, beginning the week prior to treatment, and 4-6 weeks post-treatment at various locations in lake (i.e., middle of the lake, untreated areas, and treated areas).
- Herbicide residue monitoring should be coordinated with the applicator or monitoring consultant, and should occur more frequently within several days of treatment. Residue monitoring of sediments may be warranted, particularly with large-scale repeated treatments.
- Drawdown: Record lake levels weekly and note any abnormal conditions. Other monitoring may be required as a condition to the permit.
- Harvesting: Measure turbidity before and after harvesting.

Monitoring for Long Term Changes in the Community:

The goal of monitoring is to watch for ecosystem changes and so is distinct from the initial assessment of the plant community. Change may include: new populations of a known invasive species; reemerging populations of a previously treated population of an invasive species; a different invasive species; or changes in the native plant community.

The goal of monitoring is to watch for ecosystem changes.

Aside from plants, there may also be changes in physical and environmental parameters, or in other species, such as fish and macroinvertebrates.

In general, baseline aquatic plant monitoring ([Appendix B](#)) of the lake plant community should be performed at least every five years (see Part 1. Creating Your Plan/Inventory: Lake Information/Plant Community).

- Watch for changes in species diversity or changes in abundance of native species, and not just for the presence or absence of exotics. A decrease in diversity or an increase of one particular species may be an early-warning sign of changing water quality.
- Track parameters such as the Floristic Quality Index. These can be extremely useful over time.

Volunteers can do much of the monitoring. Monitoring strategies differ somewhat by species. Please go to the Citizen Lake Monitoring Network web site and view individual chapters of the [Wisconsin Citizen Lake Training Manual – AIS Training Procedures](#) for different species.

Part 3. Contingency Plan for Newly-found Populations of an Aquatic Invasive Species

Each plan should have a strategy for dealing with aquatic invasive plants if and when they are discovered. Invasive plants can be removed (after confirmation of identification) *without a permit* under the following conditions:

- **Private ponds:** Manual removal or use of mechanical methods to control non-native or invasive aquatic plants from a body of water that is 10 acres or less and is entirely confined on the property of one person, can be done with the permission of that property owner.
- **Public waters:** Manual removal of nonnative or invasive aquatic plants can be done as indicated in [NR 109.07](#) without a permit when performed in a manner that does not harm the native aquatic plant community.

For treatments other than manual removal on public waters there is a state-wide “[Response for Early Detection of EWM Field Protocol](#)” ready to be put into action to control pioneer populations of aquatic invasive species before they become established. A “pioneer population” means a small population of aquatic invasive species in the early stages of colonization, or re-colonization, in a particular water body. For rooted aquatic plants, a pioneer population is a localized bed that has been present less than 5 years and is less than 5 acres in size or less than 5% of the lake littoral area, whichever is greater. Please see an example of an Early Detection Plan: [Eurasian Watermilfoil \(EWM\) Rapid Response Plan, Prepared by the Gilmore Lake Association, 2009](#).

The response procedure is a collaborative venture between the DNR, other agencies and the lake group (sponsor) as outlined below. Once a population has been spotted, the sponsor should follow the procedure below:

- Collect an entire intact specimen and submit it to the DNR within 3 days for species verification. Once the DNR verifies the species is an invasive and determines that it is a pioneer population, the sponsor should:
- Assemble a response team:
 - The response team should include an agency contact from the DNR and may include others as appropriate: County, Tribal, and/or US Forest Service personnel.
 - Leader – The leader will be the main contact person for your organization that will help implement and coordinate the response plan.
 - Monitors – Monitors will conduct AIS surveillance and track and report it throughout the response project. This should include someone who can run a GPS unit for accurate mapping.
 - This may also include SCUBA divers and snorkelers who can double as monitors and hand pullers.
 - Boat drivers: Identify boat drivers who can help monitors and perhaps help oversee any herbicide treatments.
 - Educators – Train and inform lake residents, users and the community about AIS, necessary prevention measures, and the status and objectives of the response project.

- Communicators - Write newsletter articles and press releases. They will also develop phone trees, maintain organization, community and agency contacts, and other tasks. They will schedule meetings and take minutes, and write, review or file reports and keep records.
- Treasurer – While some activities will be paid through grants, there will be costs when responding to a new population of invasive plants. The treasurer will raise money, manage bank accounts and the checkbook and will also apply for and manage grants and pay bills.
 - Estimate costs and establish a “contingency fund” & fund raising strategy.
- Consultants - Identify reputable consultants or contractors as needed to augment your team for surveys, monitoring, planning or applying herbicides.
 - A certified applicator is required for herbicide applications.
 - Ideally, the certified applicator represents a different firm than the consultants hired to help with planning.
- Conduct or contract for control of the aquatic invasive species through means authorized by the DNR in the response plan.
- Complete grant application requirements for the project and submit it to the DNR
 - Fulfill DNR reporting requirements.
 - Apply for permits if required.
- Post landings with appropriate signs declaring which invasive species is present in the lake.
- Pay all costs of the control as defined in the response plan, and request reimbursement for the state’s share of the project through the AIS Early Detection and Response grant. Be sure to request a 25% cash advance when you are signing the final grant agreement.
- Other duties discussed earlier in Recommendations such as initiating a Clean Boats/Clean Waters program.
- Coordinate with the DNR who will:
 - Consult with the sponsor and, tapping appropriate expertise within and outside the department, will develop a response plan including appropriate control methods, pre- and post-control monitoring, follow-up control and reporting requirements.
 - Determine sponsor eligibility for an AIS Early Detection and Response grant.
 - Provide on-site supervision/observation of control treatments when possible
 - Provide technical assistance as needed throughout the project.
 - Review the report and authorize grant reimbursement, when appropriate.
- There may not be a need for a formal evaluation of the success of the treatment for small, pioneer populations of an invasive species as there are for larger treatments as outlined in Aquatic Plant Treatment Evaluation, but this must be evaluated by the DNR lake coordinator.
- Update Aquatic Plant Management Plan to ensure adequate long term monitoring for recurrence of the new invasive species, or if not successful at initial control, to begin planning for a large-scale manipulation or ongoing management.